July 5, 1932. G. W. LEIMAN 1,866,311

HYDROCARBON BURNER

Filed March 26, 1931

Fig. 3.

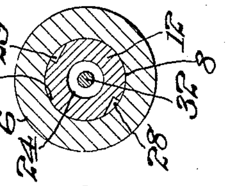


Fig. 2.

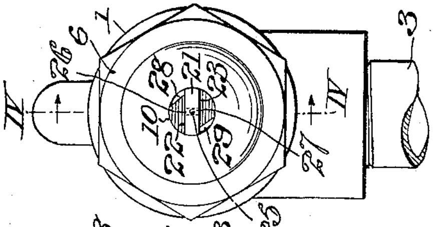


Fig. 7.

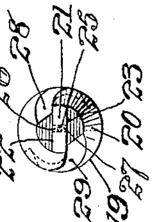


Fig. 1.

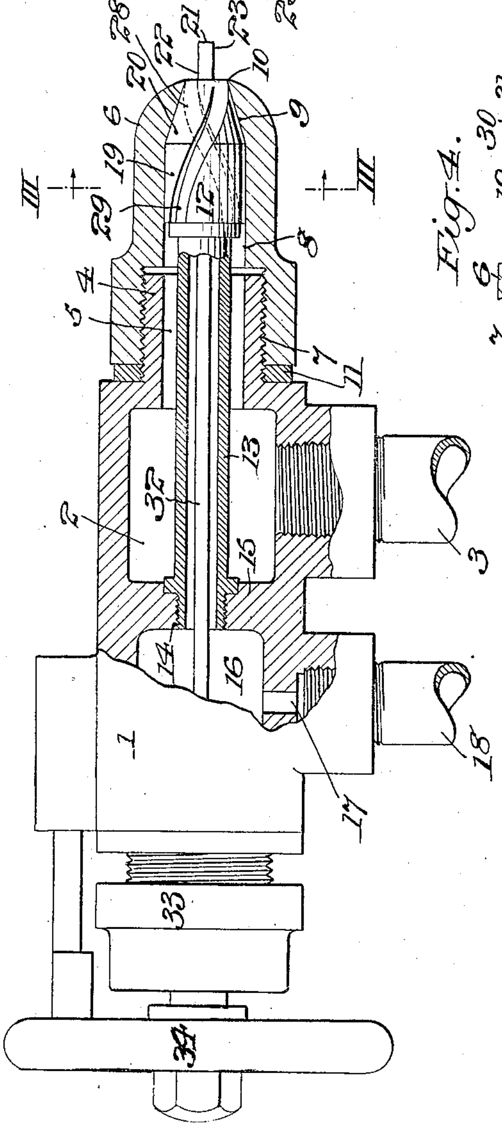


Fig. 4.

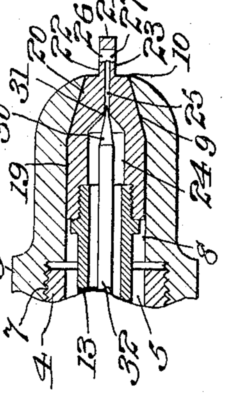


Fig. 5.

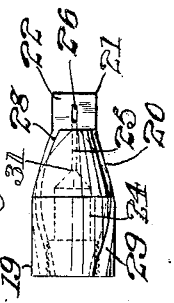
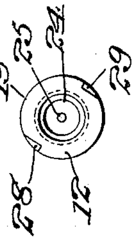


Fig. 6.



INVENTOR

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BY

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1,866,311

UNITED STATES PATENT OFFICE

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HYDROCARBON BURNER

Application filed March 26, 1931. Serial No. 525,352.

This invention relates to an improvement in hydrocarbon burners and more particularly to the discharge nozzle, whereby the atomization of the fuel is accomplished exteriorly of and adjacent the delivery end of the burner.

One object of the invention is to provide a device which will deliver the fuel to the atomizing agent at a point beyond the nozzle proper and in paths substantially at right angles to the flow of the atomizing agent.

Another object is to provide a device capable of delivering the fuel and atomizing agent in different angular paths.

Another object is to provide certain improvements in the construction, form and arrangement of the several parts whereby the above named and other objects may effectively be attained.

A practical embodiment of my invention is represented in the accompanying drawing, in which

Fig. 1 represents a side elevation of a hydrocarbon burner, partly in section, having my improved fuel discharge member applied thereto;

Fig. 2 represents a front end elevation of the same;

Fig. 3 represents a vertical section taken in the plane of the line III—III of Fig. 1, looking in the direction of the arrows;

Fig. 4 represents a detail longitudinal section of the discharge end of the nozzle taken in the plane of the line IV—IV of Fig. 2, looking in the direction of the arrows;

Fig. 5 represents a side elevation of the fuel discharge member;

Fig. 6 represents a rear end elevation of the same; and

Fig. 7 represents a front elevation of the same.

The hydrocarbon burner, to which my improved fuel discharge member is applied, is of well-known type and comprises a body denoted by 1 provided with a chamber 2 having a pipe inlet 3 by which the atomizing agent, such as compressed air, steam or other fluid is supplied thereto from a source of supply (not shown). The body 1 is also provided with a screw threaded front end 4 having a passage 5 therethrough in communication with the chamber 2. A nozzle 6 is interiorly screw threaded at 7 and is adjustable on the threaded front end 4 of the body 1. The nozzle is also formed with an interior tubular bore 8 which connects with a conical bore 9 and terminates in an opening 10 at its outer end. A gasket 11 is disposed on the front end 4 of the body 1 in position to be impinged between the body and the nozzle 6 to prevent unintentional displacement of the nozzle.

A fuel feeding member 12 is fixed to the outer end of a tube 13, the inner end of which tube has a threaded engagement with an opening 14 in the rear wall 15 of the chamber 2. This tube 13 is in open communication with a fuel compartment 16 in the body 1 and has an inlet 17 connected by a pipe 18 to the source of fuel supply (not shown). The exterior of the fuel feeding member 12 is formed with a cylindrical portion 19, a conical portion 20 and an outer reduced portion 21 having flattened faces 22, 23. The cylindrical portion 19 and conical portion 20 are arranged to coact with the walls of the tubular bore 8 and conical bore 9 of the nozzle 6, respectively, while the reduced portion 21 is disposed to extend through and beyond the opening 10 in the nozzle 6. The member 12 also has a central longitudinal bore 24 connecting with a bore 25 of reduced diameter which leads into oppositely disposed transverse ducts 26, 27 in the reduced portion 21. The ducts 26, 27 open into the flattened faces 22, 23 of the reduced portion 21, so that the flow of fuel fed from the compartment 16 through the tube 13, bores 24, 25 will be passed substantially at right angles to the longitudinal axis of the burner, the purpose of which will be hereinafter explained.

The outer surface of the cylindrical portion 19 and conical portion 20 of the member 12 is constructed with spirally arranged channels 28, 29 which coact with the bores 8 and 9, respectively, of the nozzle 6 to form passages therethrough for the atomizing agent. The channel 28 allows the atomizing agent to pass from the chamber 2 through the passage 5 and obliquely across the flattened face 22 of the reduced portion 21, while the channel 29, being disposed diametrically opposite the channel 28, allows the atomizing agent to pass therethrough and obliquely across the flattened face 23 of the reduced portion 21 in the opposite direction.

It will be understood that, while the member is fixed with respect to the body 1, the nozzle 6 may be adjusted slightly on the threaded end 4, which adjustment controls the passage of the atomizing agent either through the channels 28, 29 or allows a portion of the atomizing agent to leak between the cylindrical and conical portions of the member and walls of the nozzle and thence through the outlet 10 in the nozzle.

The feeding of the fuel through the bore 25 in the member 12 is controlled by means of a needle valve 30 which engages a seat 31 in the end of the bore 25, the stem 32 of which valve passes through the tube 13, compartment 16 and a stuffing box 33 of any well-known or approved type. A handle 34 is secured to the outer end of the stem 32 for manipulating the needle valve 30.

From the foregoing it will be seen that the fuel is caused to pass from the ducts 26, 27 in the flattened faces 22, 23 of the reduced portion 21 substantially at right angles to the flow of the atomizing agent, so that by reason of the pressure of the atomizing agent being greater than the pressure of the fuel, it (the fuel) will be blown away from each of the ducts and mixed with the atomizing agent as it leaves the faces 22, 23, thereby dividing the fuel into fine particles and effecting a highly efficient combustible vapor.

When the atomizing agent issues from the channels 28, 29 alone, the fuel will be atomized in separate fan-shaped sprays disposed in opposite directions from the outer end of the channels and ducts and in planes parallel with the longitudinal axis of the burner. If the nozzle 6 is adjusted to allow the atomizing agent to pass through the channels and between the walls of the member and nozzle, the fuel from the ducts 26, 27 will be brought together at the end of the faces 22, 23 of the reduced portion 21 and atomized into one full spray radiating from the channels, outlet 10 in the nozzle, and ducts.

By reason of the fact that the fuel is atomized exteriorly of the nozzle, the fuel is conveyed away from the burner, thereby obviating the formation or collection of tarry or carbonaceous residue in or on the nozzle of the burner.

It is obvious that various changes may be resorted to in the form, construction and arrangement of the several parts without departing from the spirit and scope of my invention; and hence, I do not intend to be limited to the details herein shown and described, except as they may be included in the claims.

What I claim is:

1. The combination with a hydrocarbon burner, of a discharge nozzle secured to the burner, a fuel discharge member located within said nozzle and provided with a reduced portion having a longitudinally arranged flat face disposed exteriorly of the nozzle and at least one transverse outlet duct in said flat face, said member also being provided in its outer surface with at least one longitudinal channel for the passage of the atomizing agent therethrough, said channel being inclined forwardly toward the longitudinal axis of the member for directing the atomizing agent obliquely across the fuel duct in the flat face to create an atomized spray radiating from the outer end of the channel and duct.

2. The combination with a hydrocarbon burner, of a discharge nozzle secured to the burner, a fuel discharge member located within said nozzle and provided with a reduced portion having a longitudinally arranged flat face disposed exteriorly of the nozzle and at least one transverse outlet duct in said flat face, said member also being provided in its outer surface with at least one spirally arranged channel for the passage of the atomizing agent therethrough, said channel being inclined forwardly toward the longitudinal axis of the member for directing the atomizing agent obliquely across the fuel duct in the flat face to create an atomized spray radiating from the outer end of the channel and duct.

3. The combination with a hydrocarbon burner, of a discharge nozzle secured to the burner, a fuel discharge member located within said nozzle and provided with a conical portion terminating in a straight portion having longitudinally arranged flat faces, said straight portion being disposed exteriorly of the nozzle and having a restricted longitudinal bore connected with at least one outlet duct in said flat faces, said conical portion being provided with at least one channel for directing the passage of the atomizing agent toward and across the fuel duct in the flat faces to create an atomized spray radiating from the outer end of the channel and duct.

4. The combination with a hydrocarbon burner, of a discharge nozzle secured to the burner, a fuel discharge member located within said nozzle and provided with a conical portion terminating in a straight portion having longitudinally arranged flat faces, said straight portion being disposed exteriorly of the nozzle and having a restricted longitudinal bore connected with at least one transverse outlet duct in said flat faces, said conical portion being provided with at least one channel for directing the passage of the atomizing agent toward and across the fuel duct in the flat faces to create an atomized

spray radiating from the outer end of the channel and duct.

5. The combination with a hydrocarbon burner, of a discharge nozzle secured to the burner, a fuel discharge member located within said nozzle and provided with a conical portion terminating in a reduced straight portion having oppositely arranged flat longitudinal faces, said straight portion being disposed exteriorly of the nozzle and having a restricted longitudinal bore connected with at least one transverse outlet duct in said flat faces, said conical portion being provided with at least one longitudinal channel for the passage of the atomizing agent therethrough, said channel being inclined forwardly toward the longitudinal axis of the member for directing the atomizing agent obliquely toward and across the fuel duct in the flat faces to create an atomized spray radiating from the outer end of the channel and duct.

6. The combination with a hydrocarbon burner, of a discharge nozzle secured to the burner, a fuel discharge member located within said nozzle and provided with a conical portion terminating in a reduced straight portion having oppositely arranged flat longitudinal faces, said straight portion being disposed exteriorly of the nozzle and having a restricted longitudinal bore connected with at least one transverse outlet duct in said flat faces, said conical portion being provided with at least one spirally arranged channel for the passage of the atomizing agent therethrough, said channel being inclined forwardly toward the longitudinal axis of the member for directing the atomizing agent obliquely toward and across the fuel duct in the flat faces to create an atomized spray radiating from the outer end of the channel and duct.

In testimony, that I claim the foregoing as my invention, I have signed my name this 24th day of March, 1931.

GEORGE W. LEIMAN.